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MBER 18, 1944
ME 33, No. 26

AMERICAN DYESTUFF REPORTER

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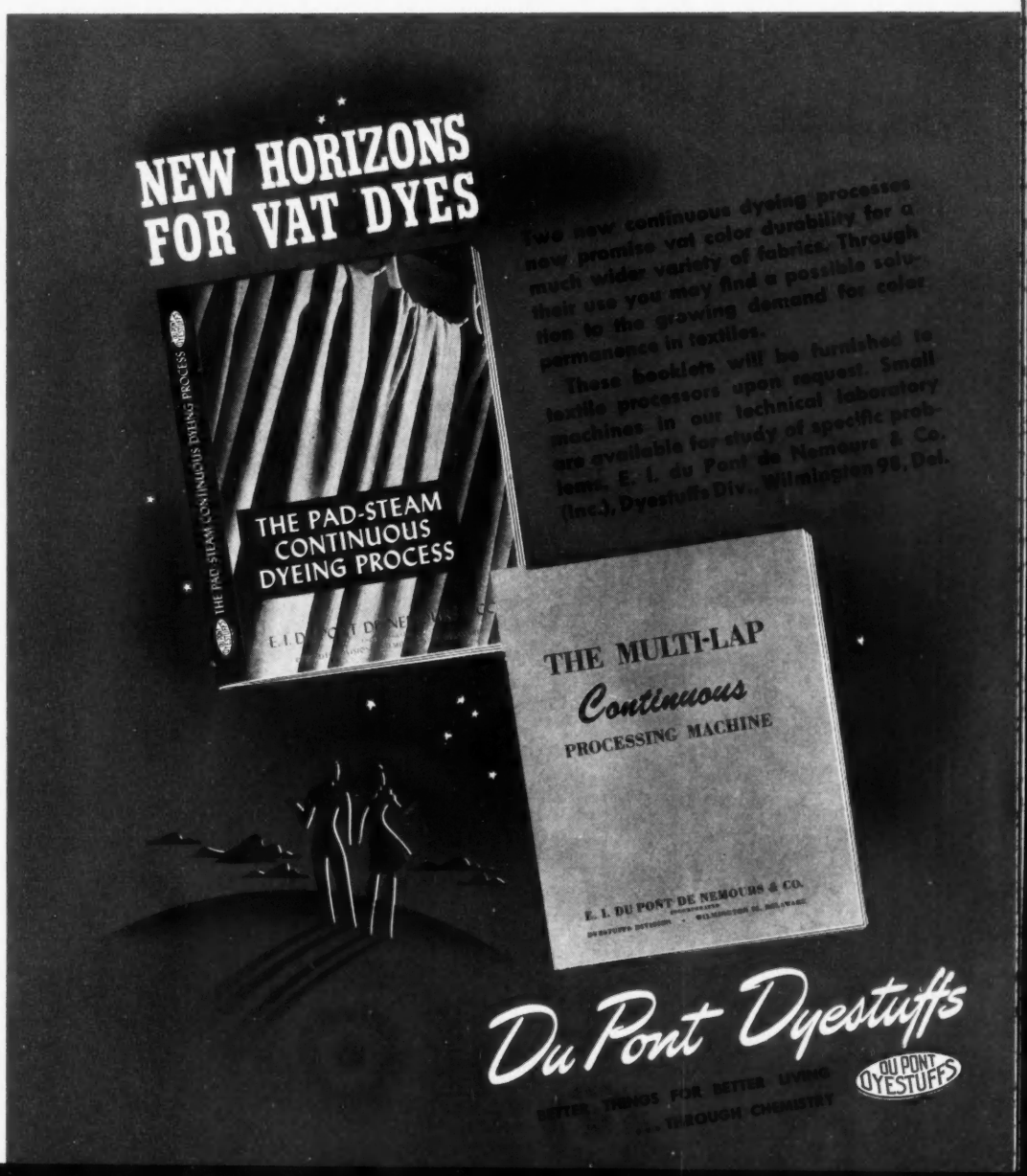
AL PUBLICATION
of the
ROCEEDINGS
AN ASSOCIATION
EXTILE CHEMISTS
D COLORISTS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These booklets will be furnished to textile processors upon request. Small machines in our technical laboratory are available for study of specific problems. E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Div., Wilmington 98, Del.
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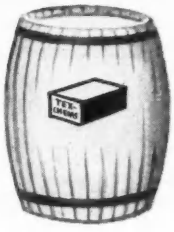
Consult our Technical Department for complete information on any TEXCHEM concentrate. Address Textiles Chemicals Corporation of Rhode Island, 511 Westminster Street, Providence, Rhode Island.



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OF RHODE ISLAND

511 Westminster St., Providence, R. I.

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VERSA-tility

. . . . these very same machines, produce *Spun-lo yarns of the finest denier for all manner of charming underthings, dresses, linings, robes and gowns. (Not much civilian *Spun-lo now—Uncle Sam needs most.)

All "Continuous Process" yarns have this in common: they are strong, uniform to an amazing degree, knot-free, and run *efficiently* in your mill.

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MAKERS OF Spun-lo RAYON YARN BY THE Continuous Process

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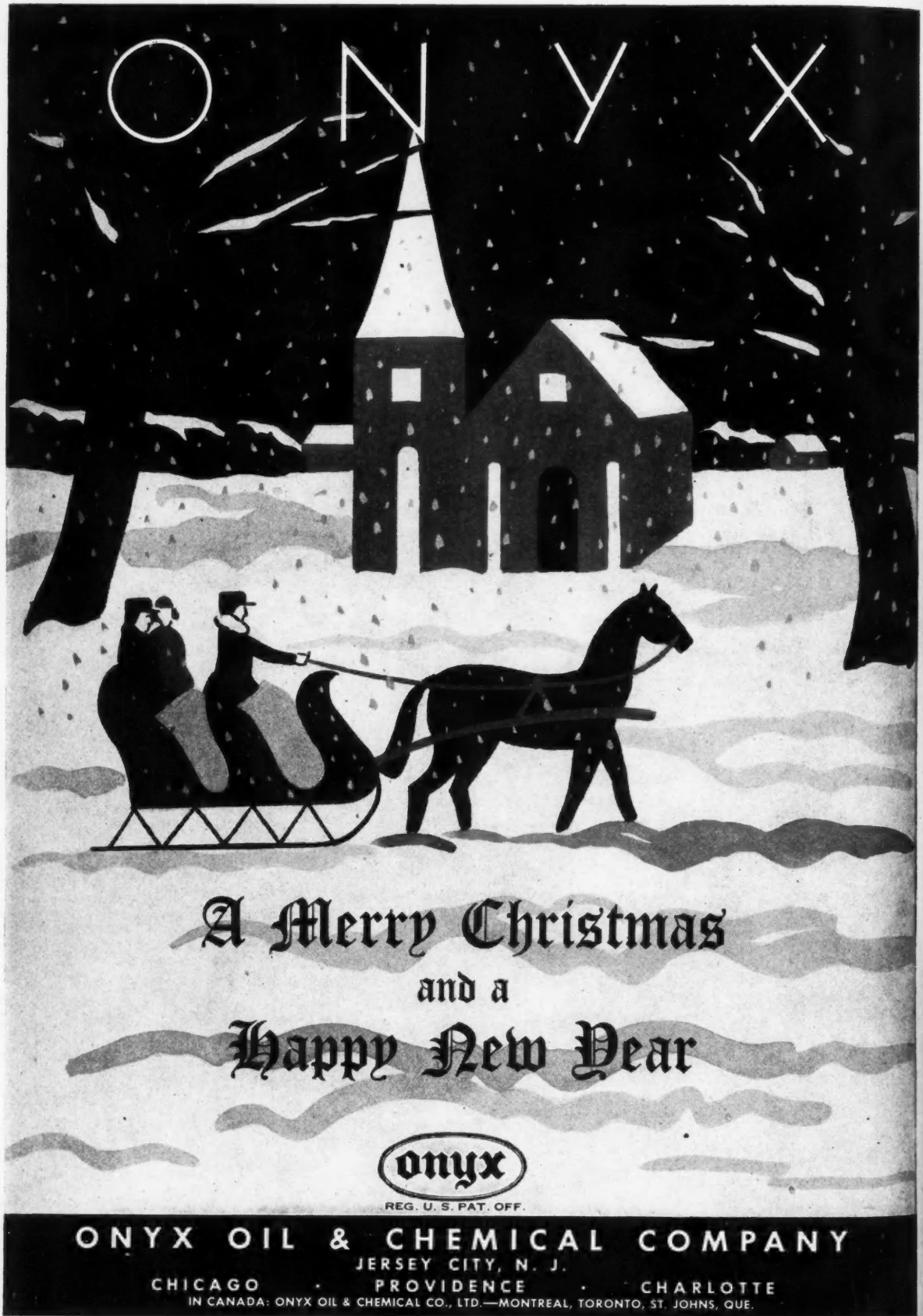
—friends whose loyal cooperation we deeply appreciate — we extend Season's Greetings and pledge our unstinted efforts to serve you well in the year to come.

NATIONAL ANILINE DIVISION

Allied Chemical & Dye Corporation

40 RECTOR STREET NEW YORK 6, N. Y.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These Hooker Chemicals are Helping Textile and Dye Chemists

Listed below are some of the Hooker chemicals that are making life a little easier for textile and dye chemists. We have indicated their principal uses in your fields, but many of them have other uses in the textile field as well. All are being produced in commercial quantities and shortages are unlikely in adopting them for your processes.

Product Chemical Formula Molecular weight	*Description*	*Uses*
Aluminum Chloride, Anhydrous $AlCl_3$; 133.3	Gray crystalline solid	Catalyst; Dye making
Antimony Trichloride, Anhydrous $SbCl_3$; 228.1	Yellowish solid	Catalyst; Dye making; Mordant in textile printing; Moisture and fire-proofing textile
Benzoate of Soda C_6H_5COONa; 144.0	White crystalline solid	Dye intermediate
Benzoic Acid C_6H_5COOH; 122.1	White crystalline material	Dye intermediate
Dichlornaphthalene $C_{10}H_6Cl_2$; 197	White crystalline solid	Chemical intermediate
Cyclohexanol (Hexahydro Phenol) $C_6H_{11}OH$; 100.1	Clear, colorless viscous liquid	Solvent
Monochlortoluene $C_6H_4Cl\text{-}CH_3$; 126.5	Clear, colorless liquid	Solvent; Dye intermediate
Orthodichlorbenzene $C_6H_4Cl_2$; 147	Clear, colorless liquid	Solvent; Dye intermediate
Phosgene (Carbonyl Chloride) $COCl_2$; 98.9	Colorless gas at ordinary temp. Colorless to light yellow liquid under pressure	Dye intermediate; Chlorinating agent
Sodium Tetrasulfide Na_2S_4; 174.23	Aqueous solution containing 40% by weight of compound. Dark red liquid.	Manufacture of dyes

In addition to the chemicals listed above, Hooker makes many more that are being increasingly used in the textile and dyeing fields. Our technical staff has been helpful in solving problems in these fields with use of Hooker chemicals and is ready to work with you in the application of Hooker chemicals to meet your requirements. A copy of the Hooker General Products List, available on request, will give you an idea of the diversity of Hooker chemicals and their uses.

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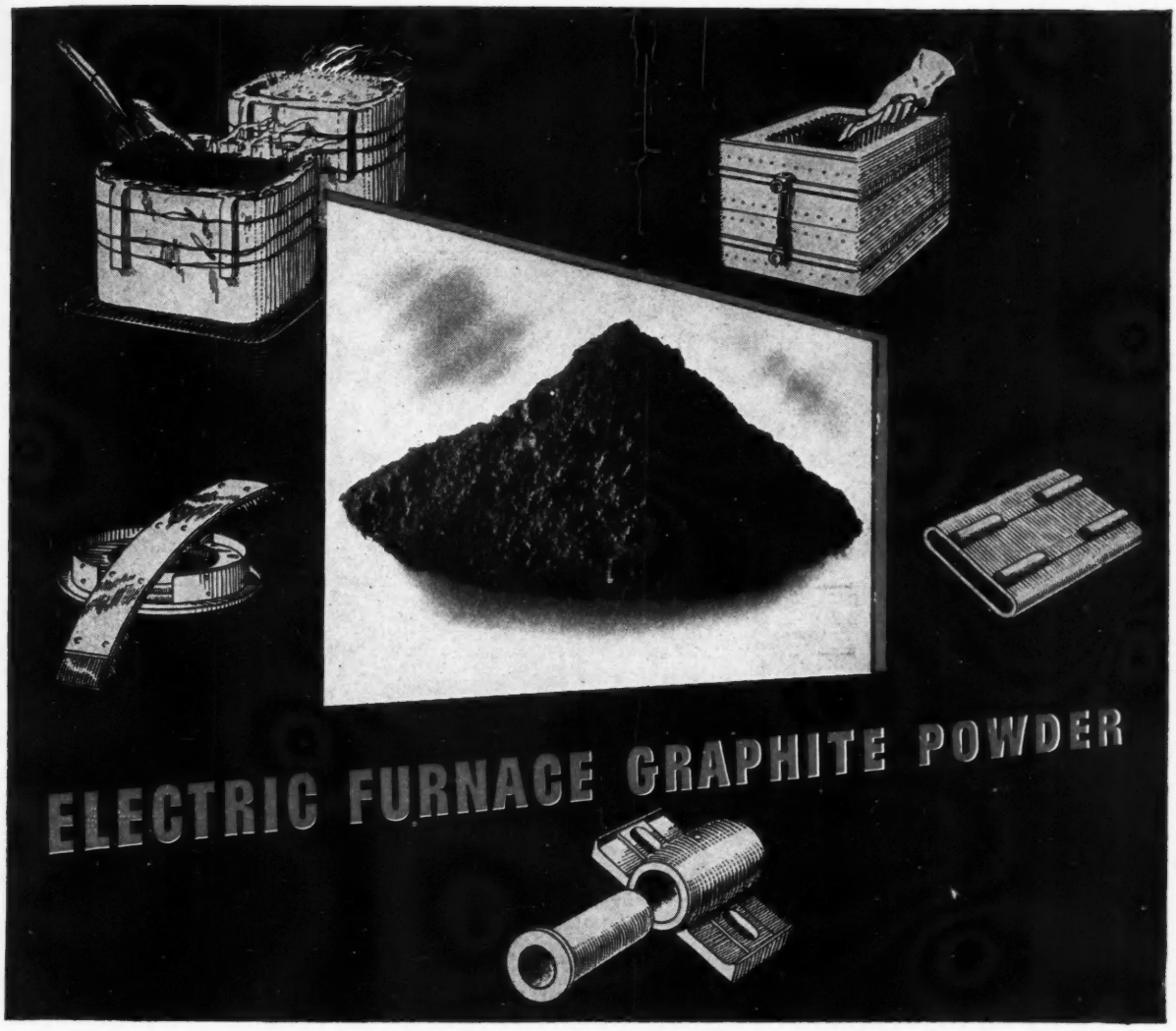
HOOKER CHEMICALS



MAKES THEM BETTER!

As a hot-topping compound, it produces sounder ingots by reducing the size of the pipe. As a mold wash, it prevents stickers. It provides brake linings with essential qualities for longer life. It is the lubricant of many oilless bearings. It is formed into electronic tube elements of high efficiency.

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To this end, an increasing amount of graphite powder goes each year to the iron and steel, foundry, chemical and process, petroleum, rubber, mechanical, and many other industries. Besides the applications illustrated, graphite powder is used in powder metallurgy, clutch facings, fabric belting, greases, wire drawing, rubber compounds, powder glazing, crucibles, batteries, boilers, ink and paint pigments, pencils, crayons. The list grows steadily.

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Ask us how electric furnace graphite powder may help serve you . . . or serve you further.

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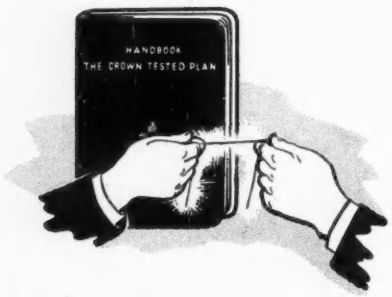
NEW 1.0 DENIER FIBER IN "CROWN"* TESTED FABRICS FOR BLOUSES AND UNDERWEAR

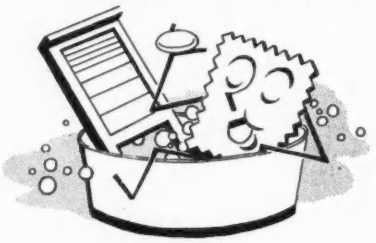
No. 37 of a series—from our files on the CROWN Tested Plan

DESIGNED to be both sheer and strong; finished to be genuinely hand washable—no wonder this newcomer among rayons is a winner! The converter, Stern & Stern, started with a spun rayon that was woven from American Viscose Corporation's new 1.0 denier fiber. And that in itself was

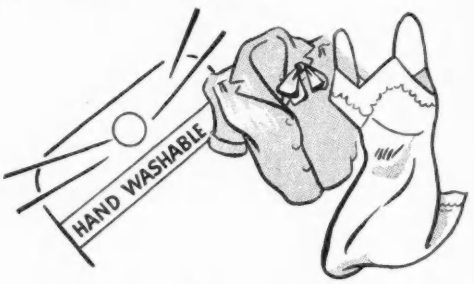


a definite advantage. For this viscose staple fiber, just recently perfected, opens new opportunities for rayons in the fine goods field.

This converter gave his fabric an added advantage by having it CROWN Tested. Dyed and finished by Bellman Brook Bleachery Company, it had all the "amber light" characteristics. It proved to be hand washable at 105°F., with a dimensional restorability of 2%. It showed a tensile strength (dry) of 20 lbs.; and it resisted sun fading, gas fading, and perspiration staining.



Very soon the garments made from this new "amber light" cloth will appear on the market. And they'll be wearing the CROWN Tested Tag—the tag that identifies quality, predicts satisfaction, for consumers everywhere.



If you work with rayon—why not let the CROWN Tested Plan help you build consumer confidence for *your* fabrics?

New

Informative Labeling

CONSUMER SATISFACTION UNDER THE THREE TAG SYSTEM

"Crown" Tested Rayon Fabric

A better way to buy rayon fabrics—This identification is awarded only to fabrics containing CROWN Rayon, after they have passed the CROWN Tests for serviceability. These tests predict the fabric will not change visibly in color or in texture, nor in size more than 2%, if instructions are followed. Samples of every dye lot of fabric have been tested against minimum requirements set and maintained by

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- Have a broad range of hygroscopicities
- Are soluble in water
- . . . and are available in consistencies ranging from liquids to waxy solids resembling petrolatum or paraffin.

● At their new lower prices, "Carbowax" Compounds—solid polyethylene glycols—and liquid Polyethylene Glycols should be even more popular as lubricants, binders, plasticizers, or thickening agents... applications where they are often superior to many natural oils, gums, and waxes ordinarily used.

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The term "Polyethylene Glycols" refers to those Polyethylene Glycols higher than triethylene glycol.

agenta and chartreuse, fully combined in a long n dinner dress by Eta. ese colors can be faithfully roduced with Calco dyes.

Color inspires the Designer

says ETA of REN-ETA, noted creator of distinguished clothes for American women.

ETA gains her color inspiration from many sources. As a result of the Greek Revival Exhibition at the Metropolitan Museum of Art, her sensational Grecian dresses were developed in colors named Revival Pink and Grecian Gold. A rare panel of Persian brocade suggested the rich-toned Islamic Green and Hispano Red shown in her winter collection. Vibrant electric colors also appear in dramatic combinations such as magenta with chartreuse accents reproduced in the photograph. "Women are in the mood to wear bright colors," according to this designer, "and it is important that color combinations be selected to present a harmoniously balanced effect."

Looking toward spring and summer, ETA has planned a series of "Pebble Colors," taken from the colorings of pebbles gathered on the beaches of Cape Cod. Beautiful pastel tints of gray, turquoise, green and light terra cotta have been dyed under her personal supervision.

Calco colors are standard in many branches of the fashion industry. Why not take advantage of this broad, specialized experience by specifying Calco dyes. Calco's Technical Service Department will gladly assist you in problems of color selection and application.

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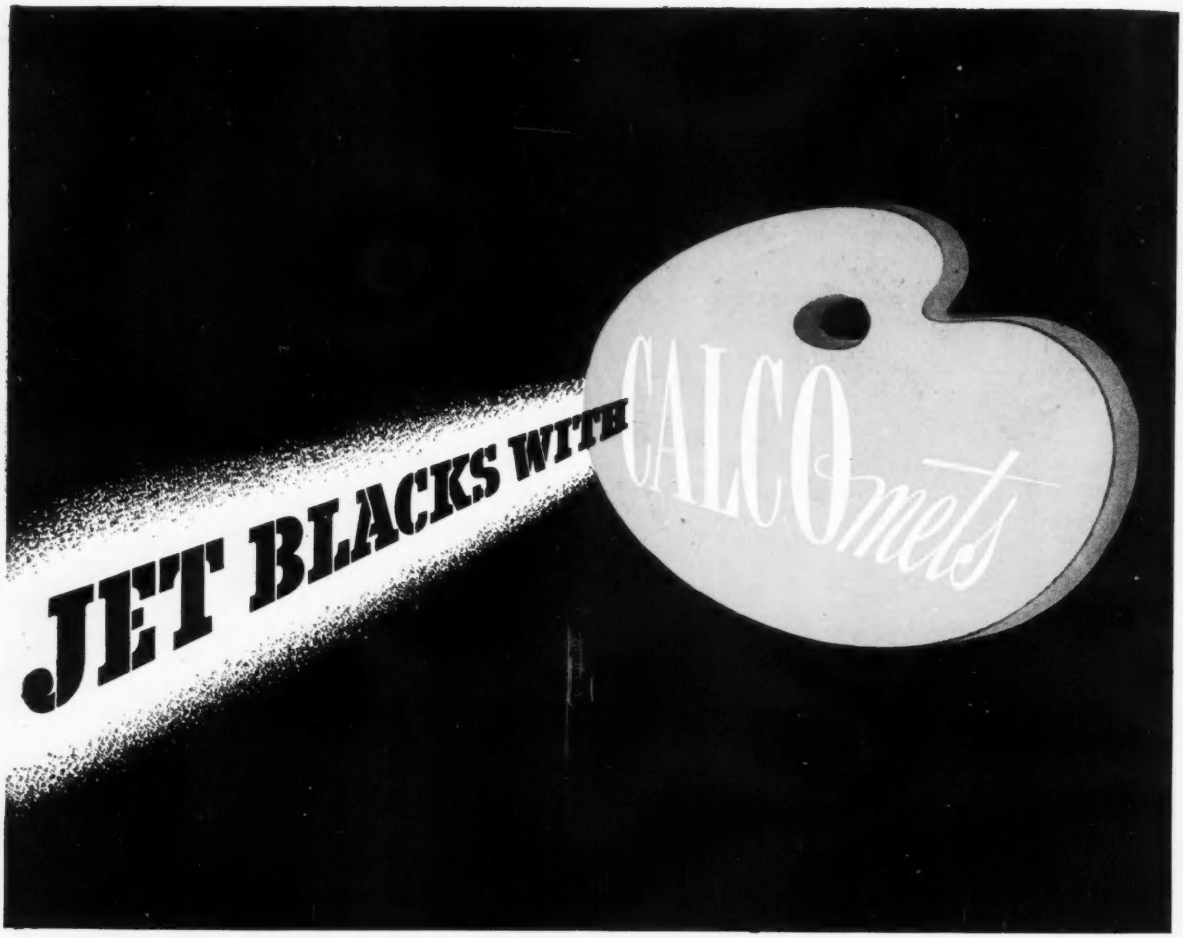
COLORS BY CALCO



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The new line of Calcomets includes, at present, Calcomet Yellow G, Calcomet Yellow M, Calcomet Orange G, Calcomet Red R, Calcomet Brilliant Blue B, Calcomet Navy Blue R, Calcomet Green M, Calcomet Brown C, Calcomet Brown N, Calcomet Gray B, Calcomet Black J.

Calco Technical Service is available for assistance during initial Calcomet dyeings. Your Calco representative will be glad to arrange a demonstration for you. CALCO CHEMICAL DIVISION, AMERICAN CYANAMID COMPANY, Bound Brook, N. J., New York, Chicago, Philadelphia, Boston, Charlotte, Providence.

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KOVAT saves labor and equipment. It uses a simple tank or barrel and a portable mixer. *Cook-up gums require a steam-jacketed kettle.*

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- "Lanafin" Soaps and Oils
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AT CHRISTMAS 1944 — our fourth wartime Christmas — limitations on time and travel may not permit us to extend in person to all our friends the expressions of good cheer that are the very essence of the Christmas Season.

But we none the less appreciate the kindly understanding of consumers of our products and the cheerful cooperation of fellow producers that has been so generously extended all through this busy year.

For the year ahead, we pledge our unstinted efforts to continue to serve you faithfully and well.

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A. P. HOWES
Publisher

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Directing Editor

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Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists

DECEMBER 18, 1944
VOLUME 33 NUMBER 26

American Dyestuff Reporter, Vol. 33, No. 26, December 18, 1944. Published every other Monday. Copyright, 1944, by Howes Publishing Co., One Madison Ave., New York 10, N. Y. Domestic subscription, $5.00, Canadian, $6.00, Foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

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SPOT RESISTANT
PERSPIRATION
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PROCEEDINGS OF THE

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DECEMBER 18, 1944

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SATURDAY AFTERNOON SESSION*

R. HOBART SOUTHER
Presiding

(Concluded from December 4th issue)

DISCUSSION

Chairman Souther: Thank you very much, Mr. Carr, for this very fine presentation and demonstration.

Everyone seems to be sold. Thank you, Mr. Carr.

As there is no discussion we will now proceed to the third paper on the scheduled program by Dr. J. Edward Lynn, who is head of the Textile Research and Development Laboratory of the American Cyanamid Company at Stamford, Connecticut. Dr. Lynn has had several years of experience in the field of finishing agents, synthetic resins, wetting agents on all types of fabrics, and different types of resins, but in particular he is well qualified to present this paper on the application of melamine and other resins for the shrinkage and felting control of wool. Dr. Lynn!

. . . Dr. Lynn presented his paper. . . .

SHRINKAGE AND FELTING CONTROL OF WOOL WITH LANASET (1)*

J. EDWARD LYNN, Sc.D.

Dr. Lynn received his undergraduate and graduate training at M.I.T., leaving with an Sc.D. in Chemical Engineering, specializing in colloid chemistry. He did some resin work at Hercules Powder Co. Experiment Station and taught colloids at the Institute of Paper Chemistry, Appleton, Wisconsin, before becoming associated with the Stamford Laboratories of the American Cyanamid Company. He has been in charge of the Textile Chemicals Group of the Technical Service & Development Division, where work on finishing textiles and on wetting agents is carried out, since February, 1943.

IN all research on removing the laundering shrinkage from woolen goods, the ultimate goal is to have a shrinkage of less than 1 per cent warp and 1 per cent filling after 15 to 20 launderings. A fabric having these values can correctly be called "shrinkproofed." No known treatment has fulfilled such hopes. At present the treatments most closely approaching the ideal can be referred to only as "shrinkage control" methods. A good shrinkage control process can eliminate practically all the felting shrinkage of wool, but at best is able only to alleviate the sponging shrinkage caused by stretching during the various processing stages.

It is becoming increasingly important to control the shrinkage and felting of wool because the tendency of the textile industry is towards greater stabilization of fabrics, e. g. the widespread sanforizing of cotton fabrics.

Dry cleaning techniques have been developed so that wool-containing garments could be freshened with a minimum of, or no shrinkage. However, organic solvents do not remove perspiration salts or water-soluble stains. Today dry cleaning is augmented by occasional light launderings, or the dry cleaning solvent contains small amounts of water emulsified by dry cleaners' soaps. These two modifications readily remove perspiration salts and water-soluble stains, but tend to cause shrinkage and felting of wool-containing fabrics.

The first methods for wool shrinkage control were mainly chemical in nature. Excellent results have been reported from England and Australia from the use of various types of chlorine and bromine-containing compounds, as well as formaldehyde, alcoholic potash, and certain enzymes such as fecin and papain. Since the chemical methods generally depend upon wool degradation for their effect, rigid controls must be maintained to prevent excessive damage to the wool. So far, trials of these methods have not been sufficiently successful in America to warrant their extensive use.

Several years ago research was started at the Stamford Laboratories of the American Cyanamid Company to find a resin that would impart good shrinkage control to wool. In the course of this work one resinous material was found which gave outstanding results in controlling wool shrinkage. This resin is a condensate based on melamine, and is usually a methylol melamine or an alkylated methylol melamine. This research has culminated in a patented shrinkage control process [1] with many successful mill trials and with a successful Army procurement of 750,000 yards of 21½ oz. all-wool interlining cloth.

The data so far accumulated indicate that the resin condensate should be practically unpolymerized, that is, it should be a monomer and strictly speaking not a resin but a material capable of forming a resin under appropriate conditions. However, since both the monomer and the finished products are commonly called resins, such nomenclature will be used herein.

Neither urea - formaldehyde, phenol-formaldehyde nor any available thermoplastic resin (acrylate, vinyls, styrenes, etc.) gave any promise of adequately controlling the shrinkage of wool (Table I). However, Speakman in British Patent No. 559,787 claims excellent shrinkage control by a several hours' refluxing of wool in monomeric resin-forming thermoplasts until a weight pickup of 13 per cent to 200 per cent, usually above 40 per cent, is obtained. Such a procedure would be time-consuming and costly.

The fact that melamine resins seem to be unique in imparting effective wool shrinkage control under normal mill operating conditions may be due to several reasons. The exact reasons are not clearly established at the moment.

Although the equipment needed for the resin application is simple and readily available in most cotton and rayon finishing plants, very few, if any of the wool

* Presented at Annual Meeting, Atlantic City, N. J., October 14, 1944.

TABLE I
Shrinkage of Resin-Treated Wool*

Resin Type	Degree of Polymerization	% Solids Used	Per Cent Shrinkage Number of Launderings 1	2	3	4	5	+1 hr.	Tensile Strength 1"x1"x3" grab (lb.) Warp	Fill
Urea	Monomer	10	7.7	10.7	12.8	15.4	18.8	31.1	...	...
Urea	Monomer	15	7.2	9.5	12.0	15.0	18.9	32.9	...	...
Urea	Monomer	20	6.6	9.7	12.8	15.4	17.0	30.4	...	...
Melamine	Monomer	10	1.8	2.4	3.0	3.6	2.7	4.6	40.8	23.3
Untreated No. 1†			9.7	12.0	16.0	19.4	23.9	37.0	39.5	23.5
Urea	Polymer	10	7.8	12.0	18.3	21.6	24.7	34.7	47.3	35.3
Urea	Polymer	20	7.0	12.1	16.5	19.5	21.9	31.1	47.3	32.8
Urea	Polymer	30	7.0	11.5	15.3	18.1	20.0	28.3	41.3	33.3
Melamine	Monomer	4	5.3	6.3	9.7	12.4	14.2	25.1	48.7	33.8
Melamine	Monomer	8	2.5	2.8	3.6	3.1	4.3	5.1	45.8	31.3
Melamine	Monomer	10	2.8	2.3	3.9	4.4	4.6	5.2	46.8	36.0
Melamine	Monomer	12	2.2	2.4	3.2	2.9	3.6	3.7	41.2	30.5
Untreated No. 2†			13.0	24.0	32.0	38.0	43.0	50.0	45.0	33.0
Vinyl	Polymer	10	11.4	18.8	26.3	31.3	...	...	47.2	35.5
Acrylate	Polymer	10	9.3	11.6	14.9	15.4	16.8	28.2	47.7	28.8

*8 oz. women's wear flannel laundered 5 times according to Fed. Spec. CCC-T-191A, plus an additional hour at 100° F.
† Untreated wool No. 1 was the roll used in the first 4 samples, the others were applied to untreated wool No. 2.

finishers are adequately equipped. As shown in Fig. 1, the arrangement of equipment for optimum results is an in-line setup of a pad mangle followed by a pin tenter leading into a drying chamber and thence to a cure box. The final operation is a washing (Dolly or log) to remove surface resin, excess accelerator, and any uncured resin or formaldehyde, and to develop a mellow hand.

The in-line setup is optimum, but many variations have been tried fairly successfully in different mill trials. The variations most frequently encountered include: (a) pad and batch before drying, a heavy squeeze with a low pickup must be used to prevent resin migration; (b) impregnate and whiz or centrifuge; (c) pad, dry and batch before curing. While these variations have given satisfactory results, they should be considered as expedients to be used only until the tandem setup giving optimum results can be made available.

The pad mangle preferably should have three bowls so that two dips and nips may be used. The mangle squeeze should be uniform and heavy enough to leave only 60 per cent to 80 per cent liquor on the goods. Drying may be carried out at about 230° F. in a well ventilated oven to insure rapid removal of the moisture. The data now available indicate that the resin should be cured in a separate drier or in a separate section of the drier at a temperature of 290° to 310° F. However, mill trials in which the goods were both dried and cured at 290°-310° F. have given good shrinkage control. The length of time needed for drying and for curing will depend on many factors including cloth weight and construction, amount of wet pickup through padder, and efficiency of heat transfer.

Many wool processors have been hesitant about the use of the 290°-310° F. curing temperature because of a possible deleterious effect upon the wool. Two indications of wool damage are a loss in tensile strength and a change in dyeing rate. Data obtained from laboratory and mill tests have indicated that even after heating for one hour at 300° F. pieces of untreated woolen goods do not show a tensile strength loss (Table II). In fact in one mill run a resin-treated all-wool fabric was dried normally and then cured for a very short time (less than 45 seconds) at 400° F. without noticeable damage to the black-dyed wool.

Heating undyed wool for 140 minutes at 277° F. (136° C.) or 302° F. (150° C.) did not change the dyeing rate beyond the limits of experimental error (Figure 2) [3].

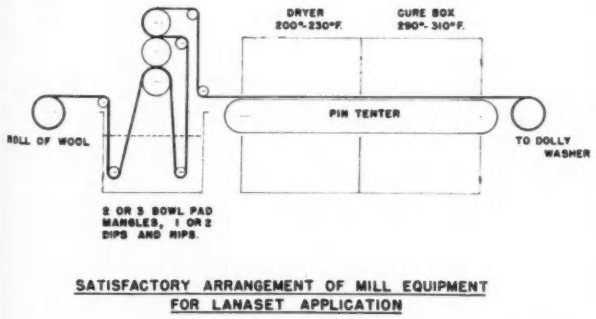
Two changes have been observed when untreated and melamine treated white wools were heated at 300° F. The first change was a yellowing, the second a slight harshening. The yellowing was readily removed in the mill by a mild peroxide bleach; and the wool can be brought to the desired mellowness by the use of softeners.

When the melamine resins were applied to all wool or part wool fabrics in the laboratory using a non-continuous or batch adaptation of the optimum equipment setup, many excellent shrinkage control results were obtained. Similar excellent shrinkage control results were obtained in

TABLE II
Effect of Temperature on the Tensile Strength of Wool Piece Goods

Treatment	Heated Time (min.)	Heated Temp. (° F.)	Tensile Strength 1"x1"x3" grab (lb.) Cloth A Warp	Cloth A Fill	Cloth B Warp	Cloth B Fill
Wet out in water	5	290	54.9	60.3	46.3	30.3
Wet out in water	15	290	55.0	60.8	...	...
Wet out in water	30	290	53.9	61.5	46.5	30.0
Wet out in water	45	290	...	...	47.8	31.8
Wet out in water	60	290	55.3	59.0	...	...
Left Dry	60	290	55.8	62.8	...	...
Wet out in water	9	350	...	...	45.3	34.8
Control	No heat		55.6	60.9	45.8	30.0

Cloth A—8.5 oz. plain weave suiting, no nap.
Cloth B—8 oz. women's wear flannel.



SATISFACTORY ARRANGEMENT OF MILL EQUIPMENT FOR LANASET APPLICATION

Fig. 1. Satisfactory Arrangement of Mill Equipment for Lanaset Application.

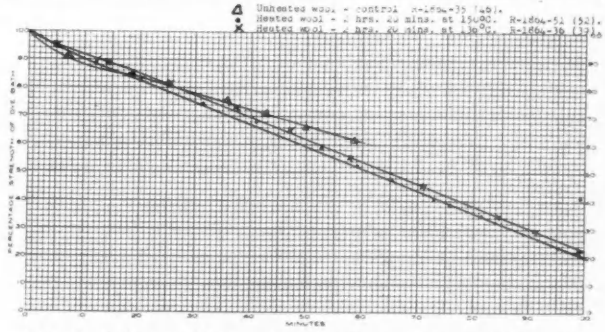


Fig. 2. Effect of Heat on Dyeing Rate of Untreated Wool. (Dyed with 3% Calcomine Fast Red 8B at 95°C in an 80:1 Bath buffered at pH 4.2).

TABLE III
Correlation of Laboratory and Mill Application Data

Where Treated	Per Cent Shrinkage Number of Launderings 1 Warp	1 Fill	2 Warp	2 Fill	3 Warp	3 Fill
Mill	3.0	0.8	3.3	0.8	3.4	2.0
Laboratory	1.9	2.0	2.3	2.2	3.0	3.3
Mill	1.1	1.7	1.6	2.8	2.0	3.4
Laboratory	1.4	0.6	2.2	2.8	3.0	2.9
Mill	1.8	0.8	2.4	1.5	2.2	2.4
Laboratory	1.5	..	1.5	..	2.8	..

TABLE IV

Sample** No.	Treatment	Per Cent Shrinkage* Number of Launderings Given 1	2	3	4	5	+1 hr.	Tensile Strength 1"x1"x3" grab (lb.) Warp	Fill
1	Resin Treated	1.5	2.0	2.5	2.4	3.1	3.5	58.5	62.0
1	Untreated	6.8	10.0	12.9	15.8	18.3	24.1	57.0	63.3
2	Resin Treated	2.2	3.1	3.4	3.6	3.7	4.7	42.8	34.8
2	Untreated	10.7	15.5	19.5	23.3	27.0	34.9	40.7	28.8
3	Resin treated	3.0	4.8	6.3	7.9	8.9	16.6	50.0	33.0
3	Untreated	17.7	28.0	32.7	37.1	40.5	43.9	56.7	35.5
4	Resin Treated	3.3	4.3	6.5	7.1	9.2	17.5	49.0	28.5
4	Untreated	16.1	23.8	33.3	40.5	43.4	51.3	45.8	29.3

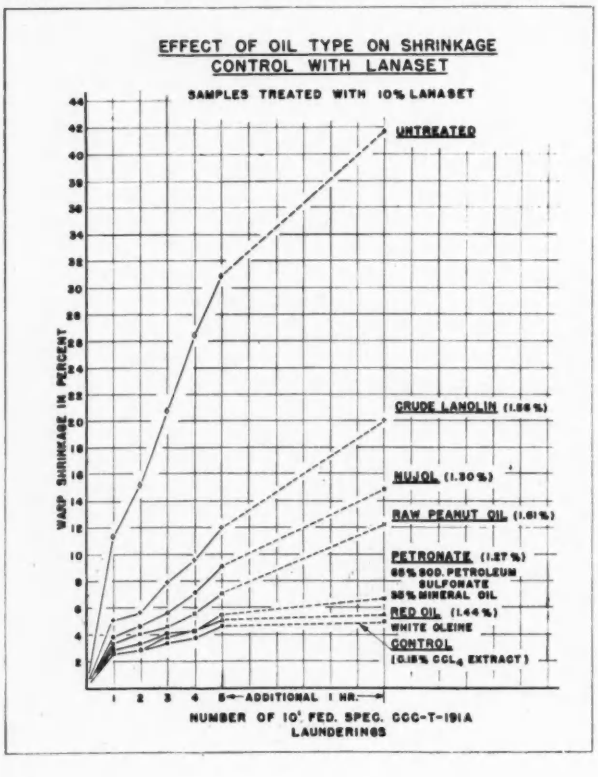
* First 5 launderings follow Fed. Spec. CCC-T-191A; "plus 1 hour" is an additional laundering for 1 hour at 100° F.
**Same numbered samples as shown in figure 4.

many mill runs using, of necessity, variations from the optimum in-line set-up. Before proceeding further it might be worthwhile examining the correlation between laboratory and mill applications. Because tests were not always run on the same pieces of cloth there is not an overwhelming stock of data. There is more data available than that shown in Table III, but the data contained therein is sufficient to show that there is a remarkably good check between laboratory and mill results.

There have been other times when excellent results in the laboratory were followed by unsatisfactory mill runs. When the factor of lack of proper equipment was eliminated, the amount and type of oil present in the goods was found to be of great importance. When the pieces treated in the laboratory differed in final shrinkage control from those run in the mill, the oil content could have been the only major difference. This was found by analysis to be true in many cases. The importance of the effect of oil type on shrinkage control is shown by Figure 3. The per cent oil applied to the samples shown in Fig. 3 was as nearly the same in each case as ordinary techniques would allow. In order to insure the maximum opportunity for good results from Lanaset (1) application, the oil content of the untreated fabric should be as low as possible, preferably below 0.5 per cent.

That equipment and oil content are not the only factors involved is readily seen from the data in Table IV and Figure 4 [3]. The fabrics were all 8 oz. woolens from different mills ready for dyeing or finishing. Microscopical examination did not reveal any marked differences between the fabrics. The differences in dyeing rates (Figure 4) and in shrinkage control obtained (Table IV) indicate variations the nature of which will have to be determined. Since the differences may stem from many factors including: source and type of wool, scouring and carbonizing procedures, oil type and content, twist and grade of yarn, and fabric construction (both knit and woven), the task of unraveling the causes is quite complex. Any help in tracking these factors that the mills will offer, will be greatly appreciated. Knowledge of the past history of submitted samples, especially with regard to the factors mentioned above, would be extremely helpful. We hope that those interested in the process will furnish as much of the desired information as possible.

When a melamine base resin is correctly applied to wool and given a good cure, the wool does not have any of its desir-



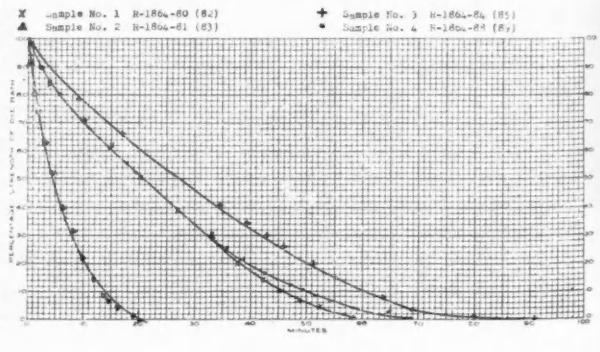


Fig. 3. (Left) Effect of Oil Type on Shrinkage Control with Lanaset.
Fig. 4. (Below) Dyeing Rate of Several 8 oz. Woolen Fabrics. Goods were from different mills; all were standard fabrics ready for dyeing. Sample numbers (1-4) are the same as in Table IV. (Dyed with 3% Calcomine Fast Red 8B at 95°C in an 80:1 bath buffered at pH 4.2).

able properties changed appreciably. Sometimes the tensile strength of the resin treated fabric is slightly higher and sometimes lower than that of the untreated: much of the time there is no significant change (Tables I and IV). A tensile loss is generally believed to be due to surface resin and should be minimized by a good heavy mangle squeeze followed by a rapid efficient drying.

Up to the present, most of the successful mill trials have been made on woven piece goods both all wool and wool mixed with rayon or cotton. Both woolens and worsteds have been treated. Data so far collected indicate that the resin will last for the life of the fabric and a good shrinkage control will be maintained for at least 10 Fed. Spec. CCC-T-191A launderings (Table V). One of the fabrics reported in Table V (the tropical worsted) is shown in Figures 5 and 5A. in order to illustrate felting control after the 10 launderings. After the 10 launderings the treated was 23/1000 of an inch thick while the untreated was 33/1000 of an inch thick. As can readily be seen (Figure 5) the weave of the treated is readily evident while that of the untreated is obscured by the felting.

The felting control shown in Figure 5 [3] is not as great as has been obtained in the laboratory on an 8 oz. flannel. For this fabric the following shrinkages and thicknesses were obtained after 10 Fed. **Spec. CCC-T-191A launderings:**

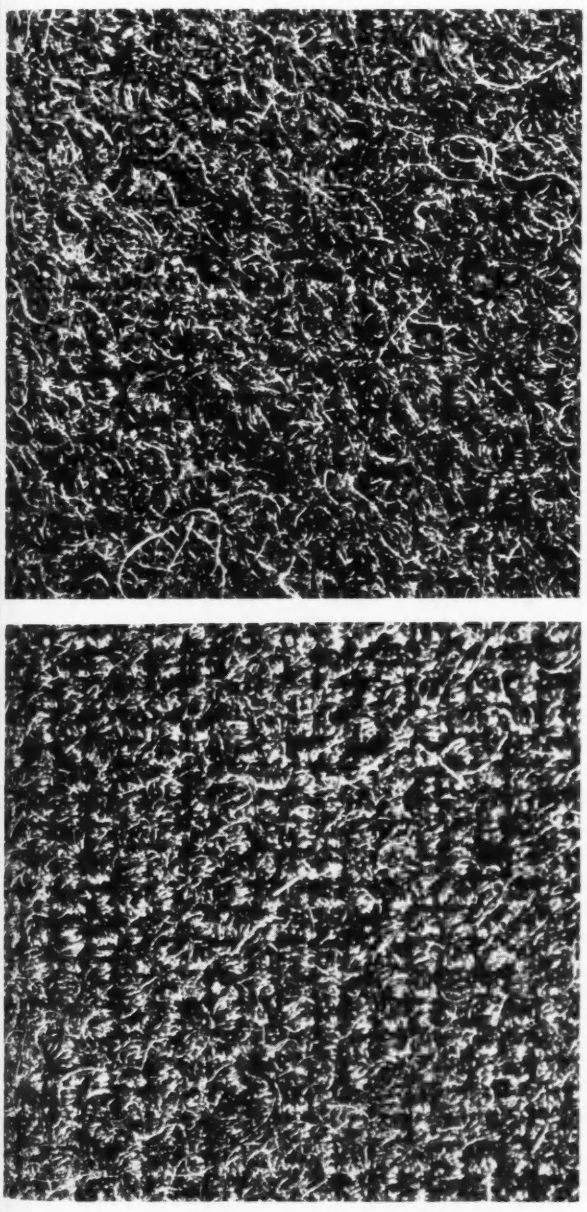


Fig. 5. Appearance of 10½ oz. Tropical Worsted after 10 Fed. Spec. CCC-T-191A Wool Launderings. The untreated is badly felted. See Table V for shrinkage. Top—Untreated Fabric; Bottom—Lanaset Treated Fabric. Mag. 10X.

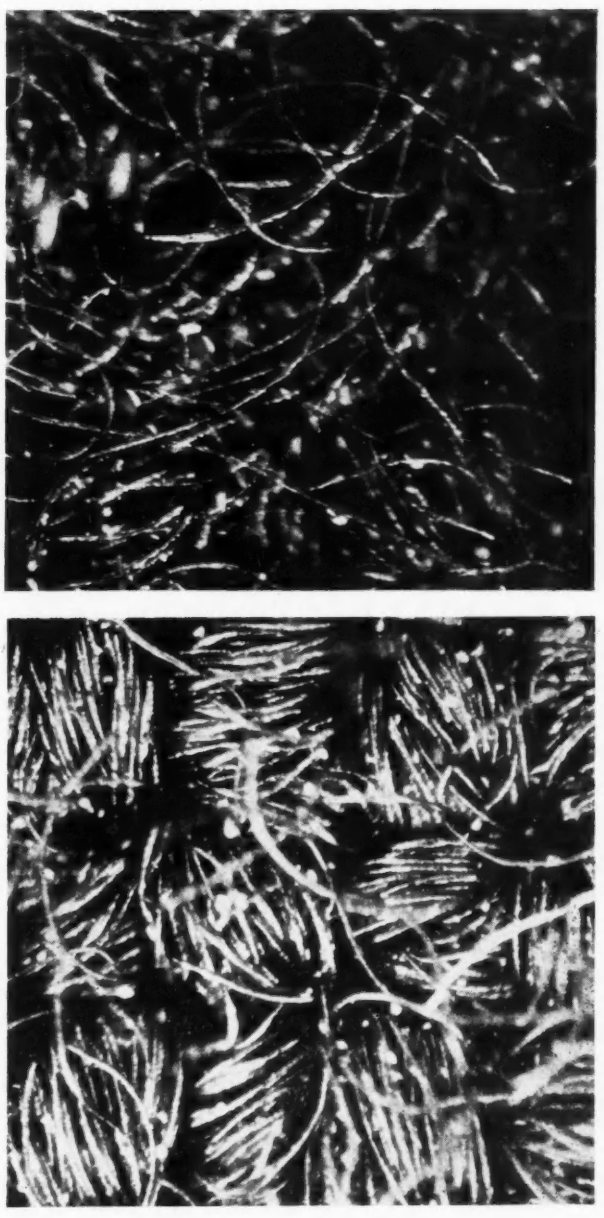


Fig. 5A. Same as Fig. 5 but Higher Magnification. Mag. 56X.

	Initial	Laundered Resin Treated	Laundered Untreated
Shrinkage	....	5.6%	43.5%
Thickness (inches)	0.020	0.022	0.062

TABLE V

Effect of Continued Laundering on Shrinkage Control
Per Cent Shrinkage*

No. of Launderings	10½ oz. Tropical Worsted** Melamine Treated		Untreated		80-20 Wool-Cotton Shirting Melamine Treated		Untreated	
	Warp	Fill	Warp	Fill	Warp	Fill	Warp	Fill
1	2.0	0.3	2.5	0.5	2.5	1.0	4.0	1.5
2	2.8	0.5	3.1	1.0	3.3	1.5	5.5	2.5
3	2.8	0.5	4.3	1.7	3.5	2.0	6.5	3.5
4	3.7	0.8	5.3	2.2	..	..	..	..
5	3.9	0.5	6.3	3.2	4.5	2.5	8.5	5.8
6	4.0	0.9	6.6	4.0	..	..	..	..
7	4.6	1.1	8.7	5.5	..	..	..	..
8	5.1	1.4	9.0	6.1	..	..	..	..
9	4.9	1.2	9.8	7.2	..	..	..	..
10	5.0	0.9	10.0	8.4	5.5	2.5	13.0	10.5

* Data obtained from mill tests of mill run materials. Launderings were 10 min. Fed. Spec. CCC-T-191A type.
** This cloth after 10 launderings shown in Figure 5 (3).

Attempts to apply melamine resins to wool in the form of raw stock, tops, and slubbing have indicated that more study and knowledge are needed before the resin can be applied to wool in all of its forms with full assurance of successful commercial results. The effect of the drastic mechanical handling of the wool during the processes of spinning and weaving or knitting on the resin and on the resin-fiber bonds seems to be important. Analytical tests show that the resin is still present after mechanical handling but probably not in the correct position or form to give shrinkage control.

The relative shrinkages of untreated and melamine resin treated skeins are shown in Figures 6-9 [3]. Figure 6 merely shows the contrast between the resin treated and untreated skeins after being washed by a modification of the technique of Le Compte and Creely [2]. Relaxation shrinkage was eliminated by equalizing the strand length under a 5 gram load after soaking 270 cm. of wool for 20 minutes in 75 ml. of 0.1 per cent neutral soap. The equi-length skeins were washed by immersing in individual 4 oz. bottles containing 75 ml. of 0.1 per cent soap and shaking for a total of 40 minutes at a speed of 324 double shakes per minute. Figure 7 shows the ease with which adjacent strands of the laundered melamine treated skeins can be separated and Figure 8, the intertwining of similarly laundered and separated untreated strands. In Figure 9, the differences in shrinkage are shown.

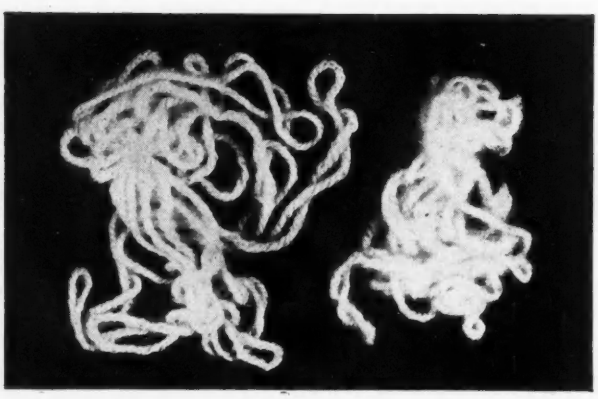


Fig. 6. Shrinkage Control of Skeins with Lanaset. Left—Lanaset Treated; Right—Untreated. Details of laundering in text.

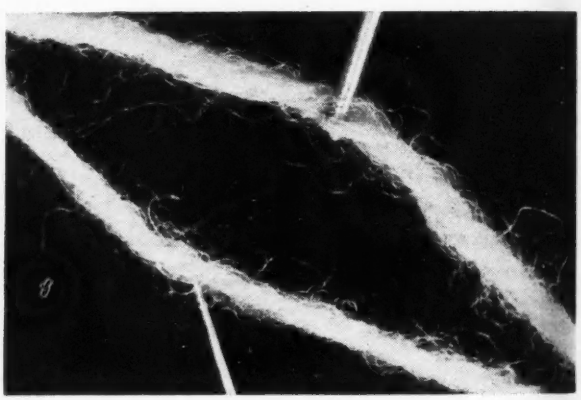


Fig. 7. Lanaset Treated Wool. This shows the separation of adjacent strands of wool from skeins shown in Fig. 6. Note lack of felting.

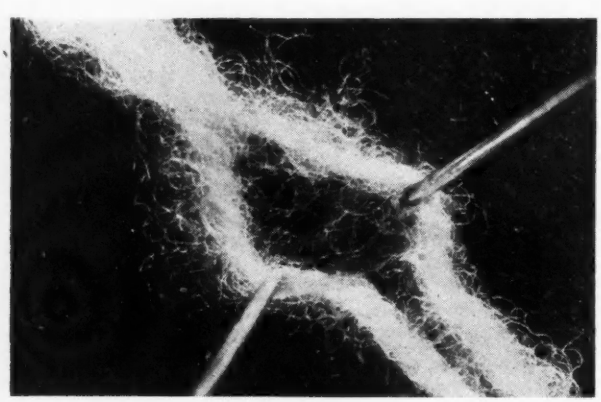


Fig. 8. Untreated Wool. This shows the separation of adjacent strands of wool from skeins shown in Fig. 6. Heavy felting is apparent.

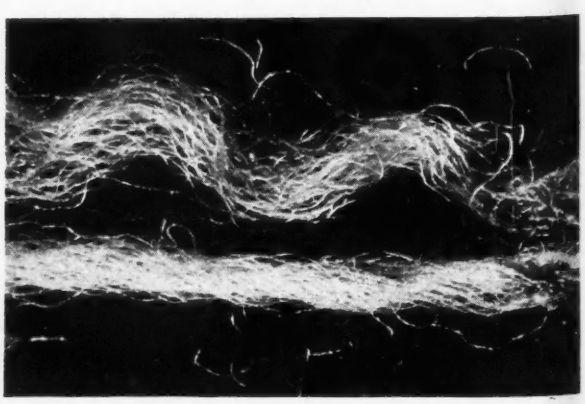
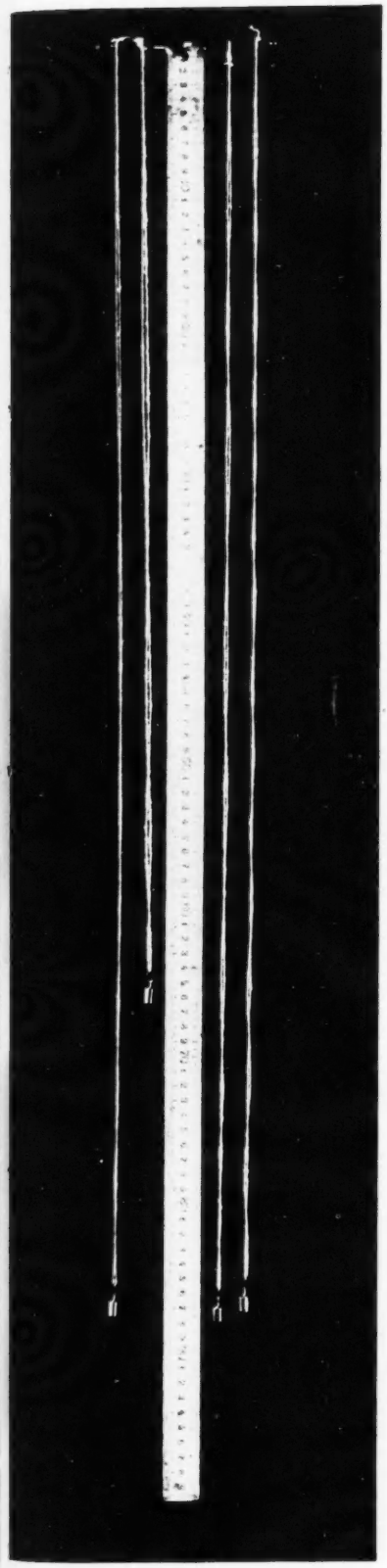


Fig. 10. Stabilization of Fabric with Lanaset. Warp threads were removed from treated and untreated fabrics and immersed for 30 minutes in quiescent water at 80°F. The untreated lost its shape, while the treated shows the former position of the filling threads. Both threads were equally soft and pliable. Top—Lanaset Treated; Bottom—Untreated.



There are many advantages associated with the application of melamine resins to wool. As discussed above, the shrinkage and felting control obtained are important from many angles. Sponging shrinkage is usually materially decreased and mill trials have shown that fabrics usually woven 61" to obtain a 56" finished width need only be woven 58" to 59" when resin treated. These factors should mean marked savings. The ability of Lanaset to stabilize woolens is shown in Figure 10 [3]. Both the treated and untreated threads were taken from a piece of woven goods and then immersed for 30 minutes in quiescent water at 80° F. The untreated thread lost its shape entirely but the resin treated shows where the filling thread originally passed through.

An unexpected property of the melamine resin was its ability to eliminate the bleeding of many dyestuffs. This is of especial importance in plaids with white or pastel blocks. The Calco Chemical Division is determining which dyes are made wash fast by the resin and which are unaffected.

The first task of resins in the Textile Industry was to improve the cheaper qualities into simulations of the more expensive items. Resins were fairly effective in this role of quality enhancement. However, the ideal use of resins should be to eliminate undesirable characteristics from the quality goods and to make the best even better. Improving the best should be of paramount interest to wool processors. There is no doubt but that wool and wool containing fabrics have usually satisfied the consumer's desires. They will continue to do so as complete advantage is taken of the new advances in resin knowledge.

The author is indebted to Miss M. C. Guldemond for the shrinkage tests, to E. P. Johnstone, Jr., for the data on the effect of oil, and to Dr. G. L. Royer of the Calco Chemical Division for Figs. 2 and 4-10.

REFERENCES

[1] Johnstone, E. P. and W. Van Loo, U. S. Patent No. 2,329,622 assigned to American Cyanamid Company. Materials now trade marked as "Lanaset" by the American Cyanamid Company.

[2] Le Compte, G. C. and Creely, J. W., Am. Dyestuff Reporter, *29* 387, 1940; *30* 247, 1941; *31* 667, 1942.

[3] Figures 2 and 4 to 10 were made available through the courtesy of the Microscopical and Research Section of the Calco Chemical Division of the American Cyanamid Co.

Fig. 9. Yarn Shrinkage Control. Yarns shown, from left to right, are as follows: first, untreated, unwashed; second, untreated, washed; third, Lanaset treated, unwashed; fourth, Lanaset treated, washed. (Washed by adaptation of method of Creely and LeCompte [2]. *See text for details).*

DISCUSSION

MR. YOUNG: How can melamine resin be removed from wool?

DR. LYNN: It is much easier to answer how I can remove wool from melamine resin. I do not know of a method which will not destroy the wool. There is no method available for the quantitative determination of melamine resin on wool.

MR. CHRISTISON: Dr. Lynn, I think you might say a little something about the tendency of getting a more permanent finish on the cloth and the tendency to resist water, not exactly waterproofing but moisture resistance, or fog resistance. I think those two factors may be quite important in the fabrics that are resin treated.

There is one other thing along the line of the alleged damage by the drier, and that is that a wool when reacted with lead acetate is a fairly sensitive indication of wool damage, and that also shows practically negative results as regards the wool that has been treated. That is in addition to your tests.

There is one other thought and that is this: It would be interesting to know if there is any resin treatment that is advantageous where formaldehyde is not involved, because we have known for some time that formaldehyde does tend to reduce the shrinkage of wool and make the wool a little tougher than it otherwise would be. I think there is some possibility that you may get some benefit from the formaldehyde while you are getting some benefit from the resin as a finish, and as a water repellant, and so forth.

DR. LYNN: To answer some of your questions, Mr. Christison: One thing that we know is that when the resin is applied the moisture regain is practically the same as the untreated wool. That is moisture vapor regain. But wet water, the water itself, will not wet the wool as readily when it is treated with Lanaset as it will when it is untreated. That is what Mr. Christison meant.

MR. CHRISTISON: That is quite pronounced.

DR. LYNN: Of course, in the case of the formaldehyde, those few thermoplastics that were mentioned do not contain formaldehyde. There have been possibilities that poly-isobutylene will work. I believe there is a patent issued to the United States Rubber Company, Naugatuck Chemical Division, using normal latex as a shrinkage control medium. I believe that patent is about four or five years old, and it does not contain formaldehyde.

Chairman Souther: Thank you Dr. Lynn.

The next speaker on the program is one whom we in the South have come to admire greatly, and consider as the dean

of all Southern textile chemists. However, his reputation is not confined to any sectional borders. He is well known everywhere for his keen interest in research, and we are all indebted to him for the inspiration he has given us by the high quality of his work. It gives me particular pleasure to introduce my good friend and neighbor, Mr. H. M. Chase, Director of Research, Riverside and Dan River Cotton Mills, Danville, Va., who will speak to us on the subject of "The Treatment of Cotton Roving and Yarns with Bonding Agents." Mr. Chase! (Applause)

. . . Mr. Chase presented his prepared paper, which was published in the November 6th issue. . . .

. . . The discussion follows. . . .

THE TREATMENT OF COTTON ROVING AND YARNS WITH BONDING AGENTS*

DISCUSSION

Chairman Souther: In my opinion, this subject of increasing the tensile strength of cotton is one of the most important, if not the No. 1 problem of the cotton textile industry, and we certainly thank you, Mr. Chase, for bringing us this report of your work which has created such widespread interest.

Mr. Barker: What allowances are made for increased weight in bonding of the roving?

Mr. Chase: Mr. Barker, it amounts to very little. Of course, it can be varied according to the use you are going to put the yarn to all the way from 2 per cent to 10 per cent, but if you have anything like 10 to 15 per cent, you get a pretty stiff yarn. You can increase the stiffness with solvents. You can make your yarn as hard as wire, if you want it that way, or you can have a softer yarn which will nevertheless not stretch more than 1 per cent. In the case of a belt, where stretching would be injurious, you want a yarn which will not stretch. To my mind, the process has almost unlimited possibilities, many of which have not yet been worked out. I want to put it up to the textile chemist as a challenge to utilize that 60 per cent of strength that has been lying dormant for 150 years. We have never used it and it is right there, and with chemical treatment we can get 50 per cent of it back, and maybe more.

In this particular case, Mr. Barker, this roving which is 1.5 hank is equivalent to 8 strands of 12's yarn, but due to the contraction of the 12/4/2 ply, when it is twisted, the latter is actually equivalent to 1.2 hank. To make a perfectly fair comparison, the roving should be 1.2 hank, that is it should contain the same weight of cotton in which case it would probably break at somewhere around 26 or 27 pounds.

Mr. Barker: In other words, then, the resin added to the actual cotton fiber that is in the roving is no greater than the contraction which results in twisting ply yarns.

Mr. Chase: I would say so.

Mr. Barker: Thank you.

Mr. Chase (Dixon, Morechild & Company): You stated that you put the fibers or yarn in a plastic state by applying resin and then stretching. Isn't that the aligning of the fibers close together, and does it need that much stress?

Mr. Chase: Both, I think. When you pull on a yarn, as I pointed out—those fibers which are properly positioned will break first unless they slip. Of course, there are a lot of theoretical things about this yarn business that I don't know and that are very interesting. For instance, take the twist in a yarn. I described it as being a bundle of fibers arranged in a round section. When you give a twist to them, the inside fiber has no twist at all. On the other hand, when yarn comes out from the front rollers of a spinning frame, or a roving frame, it comes out in a ribbon. If you will take a ribbon and twist it, you will find that it has an altogether different twist from that obtained when you twist a round bundle of fibers. So that twist is a complicated problem. But nevertheless, when you put a strain on yarn, if your fibers are free to slip—I don't mean just pull apart, but I mean reasonably free to slide over each other, they will do so until the load on each one is approximately the same.

Perhaps I should go back and say that the very first thing done to yarn to increase its strength was to stretch it dry. Someone found that by stretching the dry yarn he could improve the strength materially, but it didn't stay there. The minute it was wet it lost that strength. That was really the first step.

But if you will render the fibers plastic, by putting on a synthetic resin which is usually in liquid form such as an emulsion, or solution, the fibers will slip on each other without undue strain. By the time those fibers get lined up just before the breaking point, the resin is set and holds them in that position.

Mr. Chase: Then you have maximum alignment.

Mr. Chase: You have the best possible position of those fibers. If you try to do that to a tightly twisted yarn, you will surely cut the fibers across each other. Consequently, it seems to me to be a very considerable advantage, certainly for certain purposes, to take this roving which has not very much twist in it, and which is soft, and in which the fibers are free to move, and by stretching compacting the fibers to a small diameter. I should have mentioned that the gauge of this roving is actually less than the diameter of the 12/4/2 ply to which it is equivalent. It is pulled down and compacted. If you would like to examine it after the meeting, here is a little sample of it on just the plain roving which I think might interest some of you.

Mr. Young: What type of resin have you used, Dr. Chase?

Mr. Chase: Well, that is a good question. We have used different types. One of the most useful for certain purposes is an ester gum, combined possibly with a little alkyd resin. That is a thermoplastic resin. If you want it so that it will stand heat, you would have to use more in the line of a thermosetting resin. Just the natural waxes of the cotton themselves form a good resin. This heat resistant cord which is made by a prominent manufacturer, prior to this bonding idea was done, as I said, by thoroughly wetting the yarn. It had been done before by both Sessions and Brownell, but Graybill, Newton and Gwaltney, in their patent, wet the yarn and let it age. They left it overnight. It softened it up, made it plastic, and the natural waxes and alcohols on the yarn became more or less soft, and then when they stretched it and heated it, they had a very fine result. It has never been beaten except by this bonding which adds still more strength. You have all the resins in the world to try. We have only tried a very small fraction of them so far.

Mr. Milbate: In drafting your resin-treated roving, does the draft even in the spinning?

Mr. Chase: In drafting it during the process, you mean?

Mr. Milbate: Yes, sir.

Mr. Chase: Yes, it does. It seems to stretch very evenly; if it is treated with a resin it gives the fibers a mobility. We put a little twist into the roving just before stretching—not quite the roving you would expect to see on a roving frame, because, of course, that would simply fall apart. We put a little extra twist into that roving, enough to hold it.

Chairman Souther: Are there any further questions?

C. W. Bendigo: I wasn't quite sure as to your elongation on the 1.5 roving. I wonder if you would mind restating that. On the last chart, I interpreted it as 2 per cent. Is that correct? There

were other lines above and I didn't know whether they represented subsequent treatments, or whether that was the normal elongation.

Mr. Chase: The roving was stretched, if I remember rightly, to an elongation of 2 per cent at the breaking point. Would it be too much trouble to show that last slide again?

Mr. Bendigo: I wasn't sure whether the other two lines gave additional information on that or not.

Mr. Chase: (Slide) you see, this has only about 1.5 per cent at the breaking point. Of course, here is where it broke, and down here at the 10-point line, it has a half of 1 per cent.

Mr. Bendigo: The other lines on the chart are always 1.5 hank roving, or are those—

Mr. Chase: No, only the first one. I put them on here in series to sort of demonstrate the difference. This is the untreated roving; you see it has very little strength. Here is something better, that is the untreated 12/4/2 ply tire cord. It has a very great elongation, however. It has 12½ per cent elongation at 10 pounds, which is really too much for a tire. If a tire is made up, of course, having elongation of 12 per cent, it will grow in use. Tire manufacturers today differ on what they want for elongation. They probably do want more than this, which is the reason why, in the preceding chart, I showed that it could be taken back to where it had elongation, although it would lose some of its strength. We couldn't keep the entire strength of the bonded yarn and get the stretch in it. It had to lose 10 or 15 per cent, but it was still better than anything so far.

This is the yarn stretched and treated, that is, the 12/4/2 ply stretched and treated, and it has an elongation at 10 pounds of 2 per cent. This is the stretched roving just to show the comparison between an unspun yarn made from roving and one which has gone through all the spinning and twisting processes, which we think is quite revolutionary.

Mr. Bendigo: I think it is a very, very interesting subject.

Christian Conradi: Mr. Chase, would you care to comment on how a resin-bonded roving compares in its resistance to chafing to a plied yarn that has been treated similarly?

Mr. Chase: That is a problem which has not been entirely worked out. It depends on the type of resin you put on it, and possibly for certain purposes you might find that the bonded roving was still inferior to the multi-ply yarn. That is a question which I couldn't possibly answer, but this research is young, and, as I say, it is a challenge to everybody connected with it. We propose to find out how to make it just as good from the roving as it would be from the multiplied yarn. Each individual specification is different. For a belt, for instance, you want absolutely no stretch. You don't want a "V" belt to stretch. You want that tight, and you want it to stay tight. For some other things, as, for example, where you have to braid the yarns, you must put a little elongation into it. In other words, you tailor-make it to suit the job.

Chairman Souther: Dr. Chase, this whole subject of increasing the strength of textiles and the strength of fibers is so extremely interesting, I would like to ask Dr. Bonnet if he will favor us with the explanation he gave me coming down on the train the other day, as to why rayon is weaker wet and cotton is stronger wet. It was extremely interesting to me, and I feel that perhaps others will be interested in his explanation of this anomaly.

Dr. Frederic Bonnet: I hope you won't feel I am here under any false pretenses, as I think Mr. Souther has explained why I am here. In the first place, I was coming to this meeting to hear these very interesting papers in regard to cotton, particularly Mr. Chase's paper about which I had heard something in the offing, as you might say. I was interested in that.

I met Mr. Souther on the train, and he was talking about cotton as usual. I said, "You know, you cotton people should have been the ones to develop rayon. The shoe is on the wrong foot. We shouldn't be competitors of yours. We should be a subsidiary of the cotton industry."

He said, "How come?"

For example, I think you have been lacking in the matter of research such as Mr. Chase has outlined here, which is extremely interesting to me, and I think it offers great hope for the future of the cotton industry of the South.

One thing I mentioned was this: I said, "Mr. Souther, why does cotton fiber shrink when it gets wet?" And he said "Well, tell me."

I said, "There are several theories and, let us for a moment talk theoretical stuff. I am putting in a bid now to show how very important some things are that seem terribly unimportant at othertimes and merely idle curiosity."

Mr. Chase has shown you a fiber of cotton with its fibrils in the twisted form. One of the things that some of this curiosity research has found is that these fibrils are wholly unaffected by water. They do not swell, they do not get wet but surrounding those fibrils there is another type of cellulosic product which does and swells very much.

When a cotton fiber is wet only the gelatinous material in between the fibrils swells and as that enlarges the fiber must contract. So much for shrinkage. It gets stronger when it is wet because those fibrils straighten out so that when tension is applied you are breaking a bundle of fibrils and not breaking them individually. When they are dry they are in an unoriented condition, you might say. So that when you get them wet and allow the cementing material to become plastic the fibrils become more parallel and you then have the strength of a bundle of fibrils pulling together.

"Well," he said, "that is very interesting but where does rayon come in?"

Well, the point I am leading up to is just this: We started out, as Mr. Chase pointed out, on the chemical end of this game by dissolving some of your cellulose and then spinning it away into pretty poor fiber at first. The reason being that this material had most of the gelatinous material and practically none of the insoluble or unwettable material in it. The ordinary viscose yarn today has a strength of about two grams per denier dry and one gram per denier wet. That is so say, there is a loss of 50 per cent in dry strength when it is wet out.

Research that was done quite a number of years before the present war began showed that when rayon yarn was stretched while in the plastic state its strength was greatly increased. This led directly to the development of tire yarn for the rubber people. They asked us to make some rayon and see how it would work in tires. In other words, by orienting the molecular structure of the rayon fiber a much stronger yarn was produced.

Further theoretical research showed, among other things, through the use of X-rays that unstretched rayon shows little or no orientation but when stretched it becomes more and more crystalline. That crystalline structure is characteristic of the fibrils of cotton, too; and cotton fiber when stretched under certain conditions as shown by Mr. Chase also becomes stronger.

When it was found that stretched rayon fibers became crystalline and strong, one thing led to another. New methods were evolved for spinning, making up solutions, etc. Thus the present yarn that is used for tires has a strength of something around three grams per denier dry and two grams per denier wet, which means that it only loses around 30 per cent of its dry strength when wet. Some other yarns have been made that have the same strength dry and wet.

So as I told Mr. Souther before long we would make a yarn which would be stronger when it was wet and would be a characteristic cotton only in a continuous filament form. (Applause)

Chairman Souther: Thank you, Dr. Bonnet. It is most interesting, I think, to have a rayon man's point of view on the strength of the cotton fiber question.

Are there any further questions to ask Mr. Chase or perhaps Dr. Bonnet?

J. Raymond Nehmens: I didn't know that Dr. Bonnet was here. He was rather apologetic about the rayon people's intrusion into the rayon cord field. Since Mr. Chase often refers to rayon cord in his talk, I would like to ask if he has hopes to throw the rayon people out of the tire cord field again. (Laughter)

Mr. Chase: Well, now, we like the rayon people very much. (laughter) We think rayon is a wonderful fiber, and we think it has a great future, but we also like cotton, and we have grown up with it. Furthermore, on cotton is based the welfare of an entire section of this country, and we must keep up with rayon. It is a friendly competition. It is my opinion that in the future they will both find their place. I think it will be many years before the synthetic fiber will arrive at all of the properties of the natural fiber. I think that the synthetic fiber will develop properties that the natural fiber does not have, and that each has its place.

However, as people whose welfare depends on the cotton industry, we must not go to sleep. Strength is not the only feature. We can do a lot of other things with cotton, as I pointed out, in this same process. We can make it mildewproof, waterproof, bacteria and fungi-proof. We can color it, and we can do a lot of things with it. We have heard a lot in many of the papers today about the application of the new synthetic resins, and here is an opportunity to apply them and to make new products, and to gain that 60 per cent of strength that has been dodging us for 150 years.

As I said, take a skein of 22's yarn. It will break at about 100 pounds. If every strand of that yarn were perfectly uniform, it would break at 150 pounds, and if we got the full strength of that fiber —and I don't see anything impossible about it—it would break at 300 pounds. It has the strength of mild steel, and so far rayon hasn't got that. Maybe they will get it. They have developed some wonderful types of rayon. As I say, it is a friendly competition, and competition is the life of any business. (Applause)

Chairman Souther: Mr. Chase, thank you, and thank you again, Dr. Bonnet. I think these papers and discussions have been most interesting and instructive, and I wish to thank you all for your helpful participation.

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CORRECTION

Re: Report of Rhode Island Section Meeting

IN the report of the October 27th meeting of the Rhode Island Section which appeared in the November 20th issue, it was erroneously stated that the Intersectional Contest prize money would be distributed among the several members of the committee who did the most work.

The prize money was distributed among people who were not members of the committee or association but who were connected with companies of members of the committee. It was these people who did a great deal of work which helped to make the paper a success.

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MEETING, NEW YORK SECTION

THE first meeting of the New York Section for the 1944-45 season was held on Friday evening, November 17th, at the Downtown Athletic Club, 19 West Street, New York City.

The chairman, Emmett Driscoll, extended congratulations to the Philadelphia Section on the success of the annual meeting held in Atlantic City. He referred to those members of the New York Section who had contributed toward this success.

A motion was made, seconded, and carried that the total cost to members of the ordinary meetings of the New York Section shall be limited to $3.

The technical program consisted of a symposium on "Recent Developments in Synthetic Fibers and Their Uses in Fabrics." Speakers participating in this symposium were:

Philip D. Atwood, Nylon Division, E. I. du Pont de Nemours & Co., Inc.

Rene Bouvet, Manager, Textile Unit, American Viscose Corp.

Games Slayter, Vice President and Director of Research, Owens Corning Fiberglass Corp.

It was announced that the next meeting would be held on January 12th and that the subject would be: "Recent Developments in Dye Application and Their Use in Textiles."

The attendance was 225.

Respectfully submitted,

Norman A. Johnson, *Secretary.*

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APPOINTED PHILADELPHIA COUNCILOR

ARTHUR E. JONES, JR., has resigned as Councilor of the Philadelphia Section and Dr. Glen S. Hiers has been appointed to fulfill the unexpired term.

Lapel buttons, bearing the seal of the Association can be purchased by members in good standing, from the Secretary, for $1.50 each

CALENDAR OF COMING EVENTS

Meeting, New York Section, January 12th, 1945. Symposium on "Recent Developments in Dye Application and Their Use in Textiles."

* * *

Meeting, Philadelphia Section, January 12th, 1945.

* * *

Meeting, Northern New England Section, January 26th, 1945.

* * *

Meeting, Rhode Island Section, Providence Engineering Society Hall, 195 Angell Street, Providence, R. I., January 26th, 1945.

1944 YEAR BOOKS

The printing of the Year Books was completed about two months ago.

There has been considerable delay since then in having the copies bound.

As soon as the binding has been completed the copies will be mailed out but we are unable to set a definite date.

25TH ANNIVERSARY, A.A.P. CHICAGO OFFICE

THE Chicago office of American Aniline Products, Inc., celebrated its 25th anniversary at a dinner in the Bismarck Hotel, Chicago, on Friday, November 17th, 1944. The dinner was attended by G. L. Armour, executive vice-president from the New York office, who presented certificates exchangeable for gold watches to Elmer F. Smith, manager, and six other employees who have been with the Chicago office for twenty-five years or more.

The Chicago territory was originally covered by B. R. Armour and in later years by G. L. Armour. This eventually led to establishing the branch office 25 years ago at 1818 South Clinton Street. Its sales included not only dyestuffs but supplies for laundry and dry cleaning industries. At the start there were 35 employees.

James W. Peck was the original manager and was followed by Frederick Trowbridge. Upon Mr. Trowbridge's death in 1924, Elmer F. Smith was appointed manager, which position he still holds today.

In 1930 the branch was relocated at 820 South Clinton Street and has been there ever since. The present headquarters has sales offices, warehouse, shipping facilities, and a modern up-to-date dye application laboratory.

Elmer Smith started his career in the color business in 1907 with the Sherwin-Williams Company and later spent some time representing National Aniline and Chemical Co. He joined the Chicago branch of A.A.P. at its inception.

• ANNUAL MEETING, T. R. I.

The research jobs which the Textile Research Institute, Inc., is now conducting were the subjects of the various sessions of the Institute at its annual meeting in New York on November 10th. The applied research projects were discussed at the morning session; the economic research projects and the educational program at the first afternoon session; and the fundamental research program at the last session of the day. At the luncheon, the speaker was Dr. Gustavus J. Esselen whose subject was "The Textile Industry —Re-Birth or Second Childhood?"

Applied Research Program

Conducted by W. D. Appel, chairman of the Applied Research Committee, that session included reports on "The Cotton Carding Project," by Professor Elliot B. Grover of the North Carolina State College Textile School; "Warp Sizing," by Professor W. E. Shinn, also of the North Carolina State College Textile School; and "Radiation Drying," by Dr. Richard L. Wilhelm, of the Institute's staff at Princeton, N. J.

Economic Research Project

The meeting on the economic research project, now being conducted by the Institute, was under the direction of Robert R. West, chairman of the Economic Research Committee. An outline of the project was presented by Dr. A. M. McIsaac, of the Department of Economics, Princeton University, who is heading it up. He explained the need for a broad-gauged appraisal of the problems and situations that will confront the textile industry in the post-war period and added that it seemed wise to try to assemble and present, in a systematic way, the best information that can be had regarding the conditions that are likely to be the course of the post-war readjustment and to influence the position of the industry for some years to come.

At this same session, Dr. Frederick M. Feiker, Dean of the School of Engineering at The George Washington University, presented a preliminary report on findings of a special Committee on Textile Education appointed by the Textile Foundation and Textile Research Institute, Inc., of which he is chairman. Dr. Feiker reported that, at a series of conferences, three specific proposals were discussed: (1) Education for technological research at the graduate level; (2) one-year textile orientation course for a non-textile college graduate; (3) teaching textile economics in colleges. The preliminary report will be followed later by definite recommendations.

Members Meeting

At the members' meeting held prior to the luncheon, reports of the Committees were made available, officers were elected, and the address of the president, F. S. Blanchard, presented.

Mr. Blanchard summarized the progress made in the five-point program approved by the directors. This progress includes the four projects in applied research now being conducted, with others under consideration; the plan to launch the fundamental research program at the Institute's headquarters at Princeton, under the direction of Dr. Henry Eyring; the start already made in the graduate training program at Princeton; the economic research project on the competitive position of the post-war textile industry; and the plans for an enlarged and improved publication and information service.

He also reported on the progress of the membership campaign. Membership income, which was $25,310 at the annual meeting a year ago, stood at $94,120, at this year's annual meeting. This income includes that from 83 old members who accepted the new basis of membership, and from 79 new members.

Officers were re-elected as follows:

Fessenden S. Blanchard, president and executive secretary; Douglas G. Woolf, first vice-president; Robert E. Rose, vice-president; Harold DeWitt Smith, vice-president; Edward T. Pickard, treasurer. New directors elected were: A. G. Ashcroft, of Alexander Smith & Sons Carpet Co., and J. E. Bassill, president, Tubize Rayon Corp.

The directors of the Textile Research Institute, Inc., now include: W. D. Appel, A. G. Ashcroft, John Bancroft, Jr., J. E. Bassill, Arthur Besse, Fessenden S. Blanchard, F. Bonnet, C. F. Broughton, Fuller E. Callaway, Jr., H. M. Chase, Earl Constantine, Russell T. Fisher, Ephraim Freedman, H. Grandage, M. Earl Heard, Marland C. Hobbs, Luther H. Hodges, Charles J. Huber, W. M. McLaurine, Louis A. Olney, Edward T. Pickard, D. H. Powers, Robert E. Rose, Edward R. Schwarz, Albert L. Scott, Harold DeWitt Smith, Charles A. Sweet, Albert C. Walker, Robert R. West, Douglas G. Woolf.

• TWO NEW DYEING PROCESSES

Two new vat dyeing processes, designed to permit the application of these durable colors to a much wider variety of fabrics than heretofore, have been developed by the Du Pont Company's Technical Laboratory, it was announced recently.

The techniques were demonstrated by means of small working models set up at the Du Pont Exhibit on the Boardwalk at Atlantic City for the benefit of those attending the annual meeting of the A.A.T.C.C. They are being made available to the textile industry without cost, as part of the company's technical service, which directs its research toward simplifying and improving the applications of its products.

While vat dyes have long been recognized for their extreme fastness to light and laundering, their application has been limited for the most part to cotton. This has been due to certain technical difficulties arising when more delicate fabrics are to be dyed. The new processes, it is believed, will avoid or overcome these difficulties, and make possible the use of vat colors in a much wider variety of fabric than ever before. These may include not only woolens, but also the

many blends of natural and synthetic fibers.

One of the new methods has been named the Pad-Steam Process. A final name has not yet been selected for the other, which operates on a multiple lap principle.

The Pad-Steam Process was the outcome of combined work of a group in the Technical Laboratory and several field technicians who translated the laboratory development to commercial practice. It has already been employed by several processors in the dyeing of some military fabrics. The method is designed to provide a simplified and more flexible continuous process which can be used economically for short as well as long yardages.

The customary vat dyeing methods usually involve reduction of the dyestuff with sodium hydrosulfite and caustic at temperatures of from 120 to 140 degrees F., and 15 minutes to an hour or more is ordinarily required for the reduction and dyeing. The exact time depends upon the nature of the specific process and the vat color selected.

It has been known for years that the time of reduction and dyeing could be decreased by raising the temperatures, but it has also been recognized that the "leuco" derivatives are not chemically stable at higher temperatures and undergo serious chemical changes when held at these levels for appreciable periods of time.

However, the Du Pont researches on the problem indicated that if reduction of the vat color on the fabric is carried out at 212 degrees, in a matter of seconds, the chemical stability of the "leuco" derivative is entirely satisfactory. Reduction is complete and the dye is distributed uniformly through the textile material. The colors are unchanged chemically and the dyeings are identical in their properties with those produced under the customary lower temperature conditions.

In the operation of the Pad-Steam Process the fabric first passes through a conventional padder, in which the pigment is applied. The padded cloth is then dried in a flue dryer, after which it is carried over a cooling cylinder and down through a "chemical pad" consisting of a solution of sodium hydrosulfite and caustic. The fabric now goes into the steam chamber, from which oxygen is carefully excluded, and is exposed there for a few seconds to a minute to a saturated steam atmosphere of 212 degrees or slightly higher. Following the steaming the cloth is subjected to conventional oxidation, soaping, rinsing and drying.

It will be noted that there are no large booster baths to be thrown away after a run of a given shade, as in customary continuous dyeing procedures. Nor is there so much costly labor and handling as in the pad-jig process. Yet the color values obtained are equal to those obtained by the older processes, the Du Pont chemists state. The process has been successfully applied in the experimental equipment to cotton fabrics of almost every type, to rayon fabrics, and to blends of rayon and cotton, rayon and wool, and other combinations. Pastel shades as well as deeper hues may be applied without difficulty, and indications are that the process may be employed not only for all vat colors but also for the other classes of dyestuffs.

The other machine was devised by William M. Wentz, technical assistant in the Dyestuffs Division, during research on the problem of continuous dyeing of delicate fabrics, such as ladies' woolen dress goods, spun rayons and combinations of animal and vegetable fibers. In ordinary continuous dyeing processes these fabrics could not be handled without undue distortion or crushing or without risk of deteriorating the fibers.

The Soda Ash Development process, released several years ago by the Du Pont Company, offered one practical solution to the chemical aspect of the problem by making it possible to apply vat colors in a mild alkaline solution instead of a strong one. The Multi-Lap equipment is an effort to answer the mechanical aspect of the problem.

The fabric is first padded and is then carried into an enclosed development bath or chamber. Here it travels on an endless slatted reel or conveyor, so arranged that the fabric is dipped into the bath on each trip around. Rolls are set at various depths in the bath to insure complete immersion on each lap, and at the end of the treatment the cloth turns a right angle over a diagonally placed bar to emerge from the center of the reel.

Throughout the process there is a minimum of tension on the fabric. The period during which the cloth remains in contact with the bath can be varied by increasing or decreasing the number of laps, without changing the speed of the machine. Another advantage of the Multi-Lap process is the unusually low ratio of treating liquor to textile materials, which makes possible relatively long periods of liquid-fabric contact in a compact, closed unit.

In addition to continuous vat dyeing of short as well as long yardages, the machine appears adaptable to direct and acid colors on union fabrics, for acid and chrome colors on wool, for continuous stripping of material containing shoddy, for continuous bleaching or for continuous preparation of material prior to dyeing.

• A.S.T.M. PLANS EARLY TEST METHODS FOR NEW MATERIALS

Members of Committee D-13 of the American Society for Testing Materials, which concluded its fall meeting at the Park Central Hotel, New York, on Oct. 20, feel almost unanimously that the committee should lead the way and should provide early test methods for new materials. This was one of the conclusions develcped as a result of a questionnaire, answers to which were received from 50 per cent of the D-13 membership.

The officers of the committee include: Chairman, H. J. Ball, Lowell Textile Institute; First Vice-Chairman, A. G. Ashcroft, Alexander Smith & Sons Carpet Co.; Second Vice-Chairman, A. G. Scroggie, E. I. du Pont de Nemours & Co., Rayon Dept.; Secretary, W. H. Whitcomb, of Rhode Island School of Design.

Other points emphasized in the results of the questionnaire were that D-13 should confine its interests to test-method development, and should not try to function as a professional society; that its present policy is useful and should not be changed; and that its meetings are constructive and worth-while.

It is also the opinion of the majority of the membership replying to the questionnaire that test methods for textile materials should include consumer goods, and that new members from consumer groups should be obtained.

Still another wide-spread opinion expressed through the questionnaire is that there should be more extensive interlaboratory testing in Committee D-13 work, and that statistical techniques should be used more extensively.

• ELECTED TREASURER AND DIRECTOR

B. R. Armour, president of Heyden Chemical Corporation, has announced the election of Mr. George B. Schwab as Treasurer and Director of the Corporation. For the past seven years Mr. Schwab has served as Treasurer and Director of The Aspinook Corporation in Jewett City, Connecticut, dyers and finishers of textiles.

• RECEIVE A. A. T. T. PLAQUES

Three honorary members of the American Association of Textile Technologists received plaques at the December 6th meeting of the Association. They were: Ernest Geier of the Duplan company who was admitted as an honorary member in November, 1939; Sir Samuel Agar Salvage, K.B.E., of the American Viscose Corp., who was admitted in January, 1941; and Dr. Harold DeWitt Smith who has just been elected an honorary member.

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Watch for another "Color Achievement" next month. Meantime, we join in wishing you all the best and brightest in Christmas cheer.

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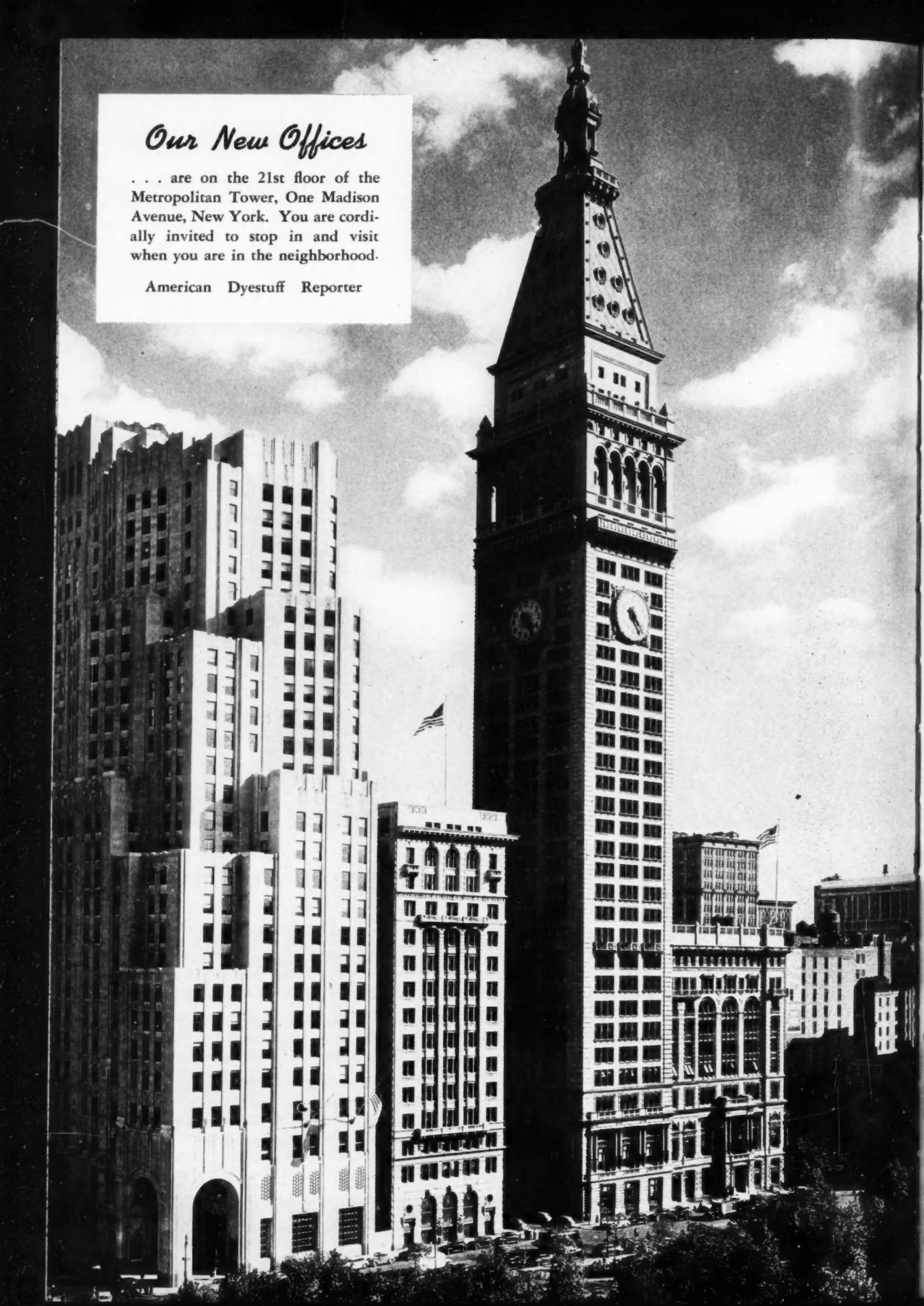
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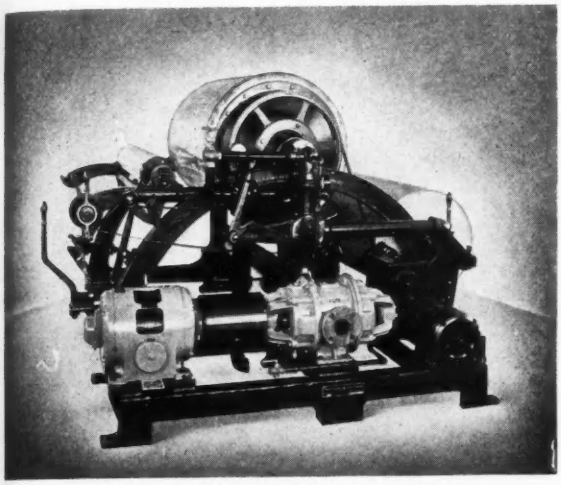

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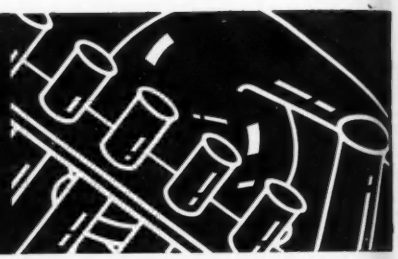

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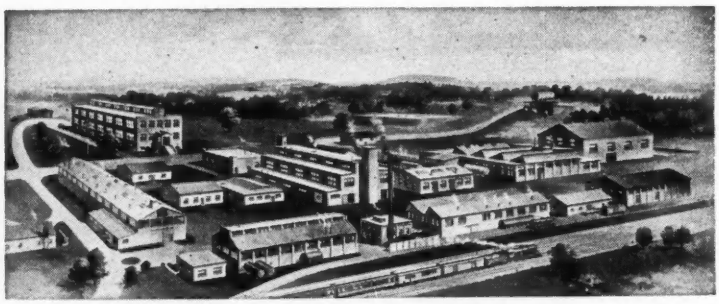

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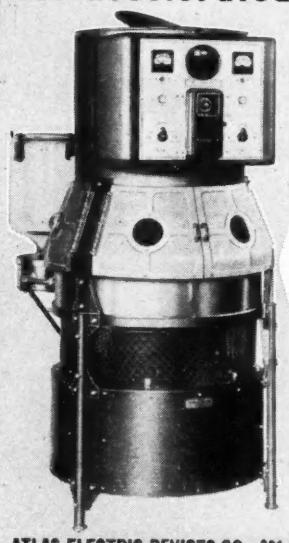

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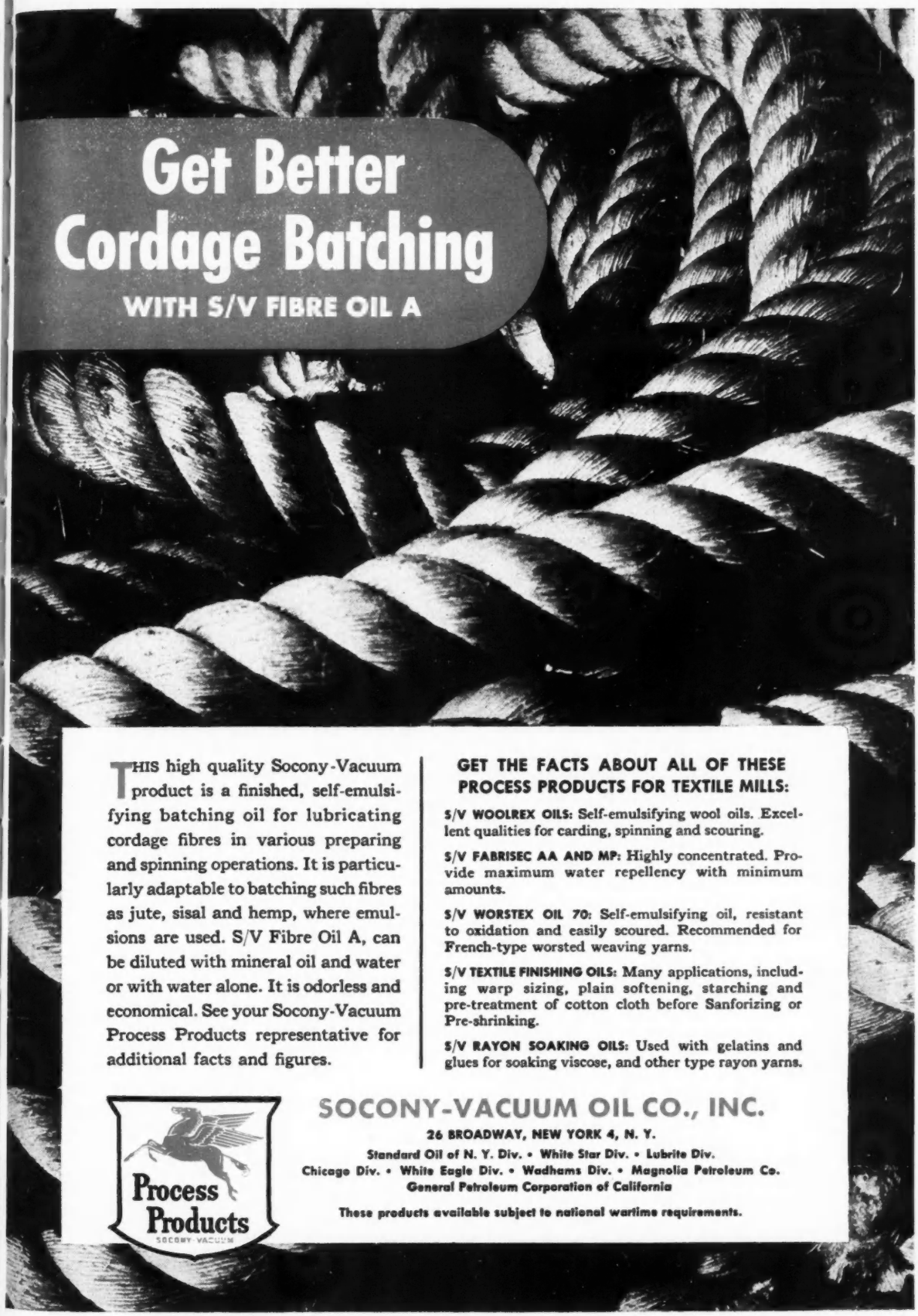

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